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WATER-DISAGGREGATING WET SHEET

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Abstract

Problem to be solved

Since a water-disaggregating wet sheet for cleaning, which could flow to a water-washing toilet, was used simply by superposing flat water-disaggregating sheets, it had a small bulk and was difficult to be held by the palms, and its handling was inconvenient.

Solution means

At both sides of a water-disaggregating sheet S1, which is creped to a low degree with a low elongation rate when being impregnating with a liquid or is not creped, a water-disaggregating sheet S2, which is creped to a high degree with an elongation rate higher than that of the abovementioned sheet S1, is joined and partially adhered and joined by an adhering and joining part A. If each water-disaggregating sheet

S1 and S2 is impregnated with a cleaning chemical, the elongation is generated by creping, however swellings are generated in the water-disaggregating sheet S2 by the difference in the elgonation rate of the sheets S1 and S2. As a result, a bulky wet sheet can be constituted.

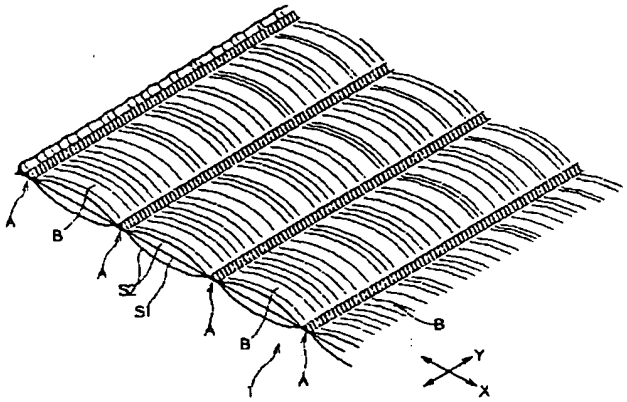

Figure 1

Claims

1. A water-disaggregating wet sheet characterized by the fact that a first water-disaggregating sheet having a crepe with a low elongation rate or having no crepe and a second water-disaggregating sheet having a crepe with a relatively higher elongation rate than that of the abovementioned first water-disaggregating sheet are partially joined; that the abovementioned first and second water-disaggregating sheets are impregnated with a chemical liquid for suppressing the water disaggregation of the abovementioned partial joined part, so that the second water-disaggregating sheet is elongated at a higher

elongation rate than that of the first water-disaggregating sheet by the impregnation of the chemical liquid and becomes bulky.

2. The water-disaggregating wet sheet of Claim 1, wherein the second water-disaggregating sheet is joined on both the surface and the back face of the first water-disaggregating sheet.

3. The water-disaggregating wet sheet of Claim 1 or 2, wherein the difference in the elongation rate between the first water-disaggregating sheet and the second water-disaggregating sheet when being impregnated with a liquid is 20-80%.

4. The water-disaggregating wet sheet of any of Claims 1-3 characterized by the fact that in the joining part for joining the first and second water-disaggregating sheets, short joining parts are arranged at intervals in the column direction; that the columns are installed at a prescribed width in parallel; that folds corresponding to the arrangement pitch of the abovementioned short joining parts appear in the second water-disaggregating sheet.

5. The water-disaggregating wet sheet of Claim 4, wherein the short joining parts are formed with an inclination to the elongating direction of the crepe folds.

6. The water-disaggregating wet sheet of Claim 5, wherein the crepe folds in the area being interposed between the columns of the short joining parts intersect with the short joining parts.

Detailed explanation of the invention

[0001]

Technical field of the invention

The present invention pertains to a water-disaggregating wet sheet to be used for cleaning, which can flow into a water-washing toilet, for sterilization, or for wiping out the hips of the human body, in particular, pertains to a water-disaggregating wet sheet which is bulkier and more easily handled rather than the conventional sheets.

[0002]

Prior art

A water-disaggregating wet sheet is used in cleaning of a toilet, etc. The water-disaggregating wet sheet is constituted by impregnating a water-disaggregating sheet (water-disaggregating paper) composed of fibers such as wood pulp fibers and a binder, which is soluble in water or swollen in water, with a cleaning chemical liquid. The cleaning chemical liquid suppresses the dissolution of the binder of the abovementioned water-disaggregating sheet, and when a large amount of water is added to it, it is diluted, so that the water disaggregation of the abovementioned water-disaggregating sheet is not hindered. Also, in the abovementioned cleaning chemical liquid, if necessary, surfactant, sterilizer, or deodorant is included. The water-disaggregating wet sheet impregnated with the

abovementioned cleaning chemical liquid wipes out hydrophilic stains of toilet, etc., and is thrown away into a water-washing toilet, and water is sent into it, so that the abovementioned cleaning chemical liquid is diluted with a large amount of water. Thereby, the water-disaggregating sheet is disaggregated in water.

[0003]

Problems to be solved by this invention

However, in the conventional water-disaggregating wet sheet, since one sheet of flat water-disaggregating sheet (water-disaggregating paper) was used or two or three sheets were superposed and used, the bulk of the sheet itself was low and very thin. Therefore, when the sheet wiped out cleaning spots while being pressed by the palms, a sense of holding when touching the sheet by the hands could not be obtained. For example, the palms and the sheet were easily slipped, and the sense of use was poor. Also, in the flat water-disaggregating paper, stains could not be sufficiently wiped out from the cleaning spots. Also, two or three sheets of water-dissaggregating papers were superposed, and a fine concave and convex embossing was applied to the water-disaggregating papers. The wiping-out effect of stains was slightly raised by the projections and recessions; however, since the bulk of the entire sheet was low, its handling was inconvenient when wiping out stains while pressing by the palms. Thus, a sufficient improvement was still not applied in such a point.

[0004]

The present invention solves the abovementioned conventional problems. The purpose of this invention is to allow the formation of a bulky, water-disaggregating wet sheet, which is easy to hold in the palm of the hand during cleaning operations, and which feels similar to a general-purpose rag.

[0005]

The purpose of this invention is also to provide a water-disaggregating wet sheet that makes fine folds appear on the surface of a bulky sheet, so that not only is slipping difficult between the palms, but stains of cleaning spots are easily wiped out.

[0006]

Means to solve the problem

The water-disaggregating wet sheet of the present invention is characterized by the fact that a first water-disaggregating sheet having a crepe with a low elongation rate or having no crepe and a second water-disaggregating sheet having a crepe being of a relatively higher elongation rate than that of the abovementioned first water-disaggregating sheet are partially joined; thus the abovementioned first and second water-disaggregating sheets are impregnated with a chemical liquid for suppressing the water disaggregation of the abovementioned partial joined part, so that the second water-disaggregating sheet is elongated at a higher elongation

rate rather than that of the first water-disaggregating sheet by the impregnation of the chemical liquid and becomes bulky.

[0007]

The abovementioned water-disaggregating sheet (water-disaggregating paper), for example, is composed of natural pulp (wood pulp) fibers, chemical fibers such as rayon, and binder. The binder is soluble in water or swollen in water, or is slowly dissolved in water, and can release the bonding between the fibers by using a large amount of water. As the binder, carboxylmethylated pulp or carboxymethylcellulose, etc., are used. Whether the abovementioned binder is soluble in water or is swollen in water is determined by the degree of etherification of the binder, number of ester bonding, molecular weight, chemical liquid impregnated in the water-disaggregating sheet, and ions included in the chemical liquid.

[0008]

Furthermore, as other binders, polyvinyl alcohol, starch, carrageenan, galactomannan, acrylic ester, etc., are mentioned.

[0009]

In the water-disaggregating sheet, a water-disaggregating paper formed by wet papermaking method, etc., is creped. The creping means a working that offers fine folds to the water-disaggregating sheet. The water-disaggregating sheet having crepes is elongated when it is impregnated with a liquid, and if

the original length is x and the length of the water-disaggregating sheet floated and elongated by the liquid is Δx, the elongation rate is expressed by $\{(\Delta x - x)/x\} \times 100$ (%).

[0010]

The first water-disaggregating sheet and the second water-disaggregating sheet are partially joined; however, in the joining, the same kind as the abovementioned water-soluble binder or binder swollen in water is used as an adhesive. Using the abovementioned binder included in the water-disaggregating sheet, the water-disaggregating sheets may also be partially joined.

[0011]

The abovementioned chemical liquid suppresses the water disaggregation of the water-disaggregating sheet by insolubilizing the joined part of the abovementioned binder of the water-aggregating sheet and the adhesive and raises the strength of the sheet, and when it is sent into a water-washing toilet, the binder and the joined part are dissolved or swollen, so that the water disaggregation of the water-disaggregating sheet is not hindered. The chemical liquid, that is, the cleaning chemical liquid is composed of water and organic solvent, and as the organic solvent, ethanol, isopropyl alcohol, etc., are mentioned. Preferably, metal ions such as calcium and strontium are included in the organic solvent. In the cleaning chemical liquid, the metal salt in the organic solvent causes a crosslinked complex with the abovementioned binder or adhesive, so that the abovementioned binder or adhesive is insolubilized.

If the water-disaggregating wet sheet is sent into the water-washing toilet, the crosslinked complex of the abovementioned cleaning chemical liquid is diluted with a large amount of water, so that the binder and the joined part (adhesive) are soluble in water or can be swollen in water. Thereby, the joining between each water-disaggregating sheet can be separated, and the water-disaggregating sheet can be disaggregated in water.

[0012]

It is desirable for the cleaning chemical liquid to include 5-95% organic solvent (including the organic solvent containing metal ions) and 95-5 wt% water. Also, in order to wipe out hydrophilic stains existing in toilet, etc., the water is included at 30-95 wt%, preferably 40-95 wt%, and the organic solvent is included at 70-5 wt%, preferably 60-5 wt%. Also, the cleaning chemical liquid composed of the organic solvent and the water is impregnated in a range of the weight of 0.5-5 times to the total weight of laminated water-disaggregating sheets. Also, in the cleaning chemical liquid, if necessary, surfactant, sterilizer, deordant, etc., are included.

[0013]

If the water-disaggregating sheet is impregated with water, the fine folds of the crepe are elongated, and the water-disaggregating wet sheet of the present invention is formed by a combination of the water-disaggregating sheets with said different elongation rates. For example, on both the surface and

the back face or one surface of the first water-disaggregating sheet having crepes with a low elongation rate and having no crepe, the second water-disaggregating sheet having crepes with an elongation rate higher than that of the abovementioned first water-disaggregating sheet is superposed. Then, the water-disaggregating sheets are partially joined with the abovementioned adhesive, etc. After joining, if the abovementioned cleaning chemical liquid is impregnated, the crepe folds of the water-disaggregating sheet are elongated, however the second water-disaggregating sheet with a high elongation rate is swollen between the joined parts due to the difference in the elongation rate by creping between the sheets, so that a bulky water-disaggregating wet sheet is completed.

[0014]

Also, with the research of the pattern of the joined part as shown in Figure 3, small folds appear in the second water-disaggregating sheet with a high elongation rate, and the appearance as shown in Figure 1 is exhibited.

[0015]

Since the water-disaggregating wet sheet is bulky, its handling is easy, and when it is held by the palms, a sense of touch close to a dustcloth can be obtained. Also, since the abovementioned folds appear, slipping from the palms is difficult, and fine stains can also be sufficiently wiped out.

[0016]

In the present invention, the difference in the elongation rate between the water-disaggregating sheets when being impregated with the liquid is preferably 20-80%, more preferably 30-60%.

[0017]

Furthermore, in the joined part of the first and second water-disaggregating sheets in the present invention, short joined parts are arranged at intervals in the column direction, and the columns are installed at a prescribed width in parallel. Folds corresponding to the arrangement pitch of the abovementioned short joined parts can appear on the second water-disaggregating sheet having high crepes.

[0018]

In other words, as shown in Figure 3, in the part (1) in which the short joined parts are formed, the elongation of the water-disaggregating sheet is suppressed, and in the part (2) between the adjoining short joined parts, since the water-disaggregating sheet is elongated, folds B appear due to projections and recessions (3) and (4) corresponding to the pitch of the short joined parts. With the appearance of the folds (B), as shown in the Figure 1, a bulky sense of the wet sheet is raised, and slipping between the palms is difficult. Furthermore, stains are easily wiped out by the abovementioned folds B.

[0019]

Also, the short joined parts are preferably formed with an inclination to the elongating direction of the crepe folds. If the abovementioned short joined parts are inclined to the crepe folds, the crepe folds of its both sides are separated by the columns of the short joined part so that they are continuous, and swellings and folds are easily formed in the second water-disaggregating sheet between the columns of the short joining parts.

[0020]

Furthermore, several small holes are preferably formed in the water-disaggregating sheet appearing on at least the outer surface of the wet sheet. In the water-disaggregating wet sheet of the present invention becomes bulky in that a cavity is formed between the water-disaggregating sheet with a high elongation rate and the water-disaggregating sheet with a low elongation rate. However, with the formation of the cavity, when the wet sheet is thrown away in the water-washing toilet, its buoyancy is increased, and it is predicted that it is difficult to be sent by water. In this case, as shown in Figure 6, small holes are bored in the water-disaggregating sheet, so that the air in the cavity between the water-disaggregating sheets is easily slipped, thereby being easily flow in the toilet.

[0021]

Embodiments of the invention

Figure 1 is an oblique view showing the structure of the water-disaggregating wet sheet of the present invention. Figures 2(A), (B), and (C) are cross sections for briefly explaining part of its manufacturing process. Figure 3 is a plan view for explaining the shape of an adhering and joining part and a state of folds appearing thereof. A water-disaggregating wet sheet 1 is used for cleaning toilet and other places or for wiping the hips, etc., and after using it, it can be thrown away into a water-washing toilet and can be dissembled or disaggregated by a large amount of water of the water-washing toilet.

[0022]

The abovementioned water-disaggregating wet sheet 1 is constituted by laminating three sheets of water-disaggregating sheets (water-disaggregating papers) S1, S2, and S2, and the three laminated sheets of water-disaggregating sheets S1, S2, and S2 are partially adhered and joined by the adhering and joining. The abovementioned adhering and joining part A is formed at a prescribed width in X direction along Y direction (column direction). The first water-disaggregating sheet S1 positioning at the center of the three-sheet superposition has crepes with a low elongation rate when being impregnated with a liquid or having no crepe, and the second water-disaggregating sheets S2 and S2 being superposed on both the surface and the back face

have crepes with an elongation rate higher than that of the abovementioned water-disaggregating sheet S1.

[0023]

Three sheets of the water-disaggregating sheets S1, S2, and S2 are impregnated with a cleaning chemical liquid. The cleaning chemical liquid suppresses the water dissolution or swelling of the binder and the abovementioned adhering and joining part A in the water-disaggregating sheets and maintains the sheet strength during the cleaning work. Also, when it is sent to the water-washing toilet and provided with a large amount of water, it is diluted, so that the water disaggregation of the water-disaggregating sheets is not hindered. An aqueous cleaning chemical liquid is used.

[0024]

If the water-disaggregating sheet is impregnated with the cleaning chemical liquid, fine folds due to creping are elongated. The first water-disaggregating sheet S1 of the center has a low elongation rate, and the second water-disaggregating sheets S2 and S2 of both the surface and the back face have a high elongation rate. Furthermore, since the sheets S1 and S2 are mutually restrained by the adhering and joining part A, the water-disaggregating sheets S2 with a high elongation rate of both the surface and the back face are deformed with swellings between the adhering and joining part A and the adhering and joining part A. Therefore, as shown in Figure 1, the water-disaggregating wet sheet 1 becomes entirely bulky.

Furthermore, the fine folds B appear in the water-disaggregating sheets S2 and S2 of both the surface and the back face. As a result, when it is held by the palms, a sense of touch equivalent to a dustcloth can be obtained, and it is easily held by the palms owing to the bulky state. Also, with the appearance of the abovementioned folds B, stains are easily wiped out. Also, the appearance of the abovementioned folds B are related to the structure of the adhering and joining part A, which will be mentioned later.

[0025]

When the cleaning work is finished, if the water-disaggregating wet sheet 1 is thrown away and sent into the water-washing toilet, a crosslinked complex generated by a reaction of metal ions in the cleaning chemical liquid and a carboxymethylated pulp or carboxymethylcellulose is diluted with a large amount of water, and the water-disaggregating sheet S1, S2, and S2 are each disaggregated or swollen in water, so that the adhesion is lowered. Furthermore, the adhesive part is dissociated and sent into the toilet.

[0026]

The materials of the abovementioned each water-disaggregating sheet S1, S2, and S2 are wood pulp fibers, non-wood pulp fibers, or rayon fibers. As the binder being used in the water-disaggregating sheets, carboxymethylated pulp or carboxymethylcellulose, etc., are used. Whether the abovementioned binder is soluble in water or swollen in water is

determined by the degree of etherification of the binder, number of ester bonding, molecular weight, chemical liquid being impregnated in the water-disaggregating sheets, and ions being included in the chemical liquid. Also, as the binder, polyvinyl alcohol, starch, carrageenin, galactomannan, acrylic ester, etc., are mentioned.

[0027]

Each water-disaggregating sheet S1, S2, and S2 is manufactured by a wet papermaking method using an ordinary papermaking machine, and creping is then applied. As mentioned above, the first water-disaggregating sheet S1 of the center is subjected to a low creping which has a low elongation rate when being impregnated with the liquid, or it is not subjected to the creping. Also, the second water-disaggregating sheets S2 and S2 of both the surface and the back surface are subjected to a high creping which has a high elongation rate when being impregnated with the liquid. The difference in the elongation rate between the sheet S1 and the sheet S2 is preferably 20-80%, more preferably 30-60%. In case the difference in the elongation rate is smaller than the abovementioned range, the entire water-disaggregating wet sheet 1 cannot be made bulky, and if the difference is larger than the abovementioned range, the thickness of the water-disaggregating wet sheet is increased too much, so that the number of sheets being housed cannot be increased when it is superposed and housed in a container.

[0028]

Next, as the adhesive being used in the adhering and joining A, an adhesive is used, which can be dissolved in water, or a water-swelling adhesive, which can be swollen by water and dissociated by a large amount of water. As these adhesives, the same adhesive as the binder of the abovementioned water-disaggregating sheets S1, S2, and S2 is preferably used. The specific properties are the same as those shown as the abovementioned binder. Also, in the adhering and joining part A, the abovementioned adhesive may be pattern-spaced on the surface of the water-disaggregating sheets; however, the binder being included in the water-disaggregating sheets can be used as it is as an adhesive of the sheets. In other words, the water-disaggregating sheets containing the binder are superposed, and moisture or a solvent is partially included in the sheets. The sheets are pressurized to the part and dried by heating, so that the sheets are adhered.

[0029]

The chemical liquid being impregnated in each sheet S1, S2, and S2, that is, the aqueous cleaning chemical liquid, generates a crosslinked complex of the binder being included in each water-disaggregating sheet and the carboxymethylated pulp or carboxymethylcellulose of the adhesive of the adhering and joining part A, suppresses the dissolution or swelling of carboxymethylated pulp, etc., and maintains the strength of the sheet when cleaning. Furthermore, when it is sent by a large amount of water in the water-washing toilet, the abovementioned

crosslinked complex is diluted, and the sheet is disaggregated or swollen in water, and the adhesive is disaggregated or swollen in water. The liquid is composed of water and organic solvent. The organic solvent is ethanol or isopropyl alcohol, etc., and metal ions such as calcium, strontium, and zinc are included in the organic solvent. Since the crosslinked complex is generated between the metal ions and the carboxymethylated pulp or carboxymethylcellulose and has a complicated network structure, the adhesive becomes insoluble in water.

[0030]

The cleaning chemical liquid is preferably impregnated in a range of 0.5-5 times to the total weight of the water-disaggregating sheets. Also, the abovementioned organic solvent in the cleaning chemical liquid is preferably 5-95 wt%, and water is preferably 95-5 wt%. Also, in case the wet sheet is used to wipe out hydrophilic stains existing in toilet, etc., water is preferably 30-95 wt%, and the organic solvent is preferably 70-5 wt%. More preferably, water is 40-95 wt%, and the organic solvent is 60-5 wt%. Also, in the abovementioned cleaning chemical liquid, if necessary, surfactant, sterilizer, deordant, etc., are included.

[0031]

An example of the method for manufacturing the water-disaggregating wet sheet 1 is explained based on Figure 2. First, as shown in Figure 2(A), the water-disaggregating sheets S2 and S2 having high crepes are superposed on both the surface

and the back face of the water-disaggregating sheet S1 having low crepes or no crepe; however, the adhesive is spread on the fitted surface of the sheets prior to the superposition. In the example shown in Figure 2(A), an adhesive 2 is spread on both the surface and the back face of the water-disaggregating sheet S1 of the center. Then, three sheets of the superposed water-disaggregating sheets S1, S2, and S2 are pressurized by heating plates 4 and 5. In the heating plate 5, an embossing part 5a fitted to the pattern of the adhering and joining part A is installed, and the sheets are heated and pressurized by the embossing part 5a. The moisture or solvent of the adhesive 2 is blown off and dried by the heating and pressurizing, and the sheets S1, S2, and S2 are mutually joined by the adhering and joining part A. The joined state is shown in Figure 2(B).

[0032]

If the laminate of the water-disaggregating sheets S1, S2, and S2 shown in Figure 2(B) is impregnated with the abovementioned cleaning chemical liquid, fine folds due to the creping are elongated, and swelling is generated in the water-disaggregating sheet S2 between the adhering and joining part A and the adhering and joining part A by the difference in the elongation rate of the water-disaggregating sheet S1 of the center and the water-disaggregating sheets S2 and S2 of both the surface and the back face, so that as shown in Figures 1 and 2(C), the bulky water-disaggregating wet sheet 1 is formed. Next, in Figure 1, the fine folds B appear in the water-disaggregating sheets S2 of both the surface and the back face; however, in order to effectively make the fine folds B appear, a pattern

shown in Figure 3 is preferably adopted as the structure of the adhering and joining part A.

[0033]

X-Y coordinates in Figure 3 correspond to X-Y coordinates shown in Figure 1. X direction is a forming direction of the fine folds due to the abovementioned creping (creping direction; elongating direction of convex tops or concave valleys of the fine folds). Figure 3 shows one fine fold of the crepe by b. Also, the adhering and joining part A is constituted by arranging several short joined parts a with a short length and a linear shape in a column, and the sheets S1 and S2 are mutually adhered by each short joined part a. The short joined parts a are intermittently formed at a fixed pitch in Y direction, and its arrangement direction is Y direction. Also, the columns (Y column) being arranged by the short joined parts a are formed at prescribed intervals in X direction.

[0034]

If each sheet S1, S2, and S2 is impregnated with the abovementioned cleaning chemical liquid, the folds due to the creping are swollen in Y direction. At that time, considering the water-disaggregating sheet S2 of the part of the adhering and joining part A, since the water-disaggregating sheets S1 and S2 are adhered in a part (1) of the short joined parts a, the elongation of the water-disaggregating sheet S2 in Y direction is difficult to generate in part (1). On the contrary, in a part (2) interposed between one short joining part a and another short

joining part a, the water-disaggregating sheet S2 is easily elongated, and loosening is easily generated in the part (2) by the elongation (i). As a result, in an area L interposed between one adhering and joining part A and another adhering and joining part A arranged in Y direction, a valley part (3) for connecting the part (1) of the short joined parts (a) of both sides is formed, and a mountain part (4) for connecting the parts (2) of both sides appears. Therefore, in the area L interposed in the adhering and joining A, the concave and convex folds B appear, almost coincident with the arrangement pitch of the short joined parts a. With the appearance of the folds B, as shown in Figure 1, a visual volume sense is entirely generated in the water-disaggregating sheet 1. Also, owing to the appearance of the folds B, fitting by the palms becomes easy, and the wiping-out effect of stains can be raised by the folds B. From the above fact, in order to effectively make the folds B appear in the water-disaggregating sheet S2 with a high elongation rate, the short joined parts a are preferably formed at a fixed pitch in the adhering and joining part A.

[0035]

Furthermore, as shown in Figure 3, each short joined part a has an inclined short linear shape with an angle to the forming direction (X direction) of the crepes. As a result, a fine fold b due to the crepe in the area L and a fine fold b of the crepe in an area L1 being interposed in the adhering and joining part are always divided by the short joined parts a. For this reason, in the areas L and L1 interposed in the adhering and joining part A, the water-disaggregating sheet S2 is reliably swollen, and the

bulky wet sheet 1 is easily formed. Also, the column direction of the adhering and joining part A, as shown in Figure 4, may be at an angle to X direction and Y direction. Also, in Figure 4, the adhering and joining part A is preferably formed by the short joined parts a being arranged at a prescribed pitch.

[0036]

Also, as mentioned above, it is necessary for the adhering and joining part A and the short joined parts a to be in the direction intersecting with the creping direction (X direction). Also, the adhering and joining part A is not formed only by arranging the short joined parts a, and the sheet S1 and the sheet S2 may also be linearly continuously adhered in the adhering and joining A, or spot-shaped adhering and joining parts may also be arranged regularly at fixed intervals or at random in X-Y direction.

[0037]

Figure 5 shows a modified example of the present invention. In Figure 5(A), the water-disaggregating sheet S1 having crepes with a low elongation rate or having no crepe and the water-disaggregating sheet S2 having crepes with a high elongation rate are superposed by two sheets and partially joined in the adhering and joining part A. In Figure 5(B), three sheets are superposed, and the water-disaggregating sheet S2 with a high elongation rate is interposed at the center, and the water-disaggregating sheets S1 and S1 with a low elongation rate or zero elongation rate are laminated on both the surface and the

back face and adhered and joined by the adhering and joining parts A1 and A2. When the water-disaggregating wet sheet 1 shown in Figures 5(A) and (B) is impregnated with the cleaning chemical liquid, the sheet S2 is also swollen between the adhering and joining parts by the difference in the elongation rate of the sheets S1 and S2, so that a bulky sheet is formed.

[0038]

Next, in the water-disaggregating wet sheet, when it is impregnated with the cleaning chemical liquid, since the elongation rate of the water-disaggregating sheet S2 is higher than the elongation rate of the water-disaggregating sheet S1, as shown in Figure 2(C), the sheet S2 is swollen between the adhering and joining parts, and a cavity C is formed between the sheets S1 and S2. For this reason, when it is thrown away into the water-washing toilet, the buoyancy is increased, and the flow is likely to be difficult in the toilet. For this reason, as shown in Figure 6, several small holes 3 are preferably bored in each sheet S1 and S2 or in the sheet S2 at least positioned at the outside. If these small holes 3 are bored, when the sheet is thrown away into the water-washing toilet, the air in the cavity between the sheets S1 and S2 escapes by the abovementioned small holes 3, so that the buoyancy is lowered. Thereby, the sheet is precipitated and easily sent into the water-washing toilet.

[0039]

Application examples

In the application examples and the comparative examples, the water-disaggregating wet sheet 1 with the same structure as those shown in Figures 1-3 was manufactured. In each application example and comparative example, as shown in the following Table I, the difference in the elongation rate due to the crepes of the water-disaggregating sheet was changed, and the other conditions were the same.

[0040]

Water-disaggregating paper

kraft pulp (N-BKP)	90 wt%
Binder	10 wt%

The abovementioned kraft pulp was adjusted so that CSF (Canadian Standard Freeness) could be 600 mL. The binder was swollen by water, and the adhesive strength was lowered. Na salt of a carboxymethylated pulp (made by Nichirin Chemical Co.) with an etherification of 0.4 was used. Using an ordinary papermaking machine, a water-disaggregating sheet (water-disaggregating paper) with a Metsuke of 25 g/m^2 prior to creping was manufactured. The elongation rate due to the creping was made different for each application example and comparative example.

[0041]

Adhesive

For the adhesive that bonds the water-disaggregating sheets, 0.2% solution of water-soluble carboxymethylcellulose (product no. 2280, manufactured by Daisel [transliteration] Chemical), with etherification of 0.8 or 1.0, was used. The aforementioned adhesive was applied in a stripe pattern, by the gravure printing method, to the water-disaggregating sheet. A triple-layer sheet was formed by applying moisture and pressure to three sheets, using either hot plate 4 or hot plate 5 containing embossed pattern 5a that is the same as the pattern on short joining parts as shown in Figure 3.

[0042]

Elongation rate

The elongation rate of the water-disaggregating sheet S1 and the water-disaggregating sheet S2 was set as shown in Table I, and for each application example and comparative example, a cleaning chemical liquid was impregnated, and the sheet S2 was swollen. At that time, the thickness size of the entire water-disaggregating wet sheet 1 was measured. The measured results are shown in Table I.

[0043]

Table I

③	① 比較例1	① 比較例2	② 実施例1	② 実施例2	② 実施例3	② 実施例4
S2の伸び率 (%)	0	10	20	30	60	80
S1の伸び率 (%)	0	0	0	0	0	0
S2とS1の伸び率の差 (%)	0	10	20	30	60	80
厚み (mm)	0.4	0.45	0.6	0.65	1.85	1.9

Key: 1 Comparative Example
2 Application Example
3 Elongation rate (%) of S2
Elongation rate (%) of S1
Difference in the elongation rate of S2 and S1 (%)
Thickness (mm)

[0044]

Thickness of the sheet

As shown in Table I, if the difference in the elongation rate between the sheet S2 with a high elongation rate and the sheet S1 with a low elongation rate was set to 20-80%, the thickness of the water-disaggregating wet sheet 1 was 0.6 mm or more, and compared with Comparative Example 1 in which three sheets were simply laminated, the thickness could be increased by 50%. Therefore, the difference in the elongation rate of the sheets is set to preferably 20% or more, more preferably 30% or more. If the thickness is too large, when the

water-disaggregating wet sheet 1 is superposed and housed, since the bulk is increased too much, the difference in the elongation rate of the sheets S1 and S2 is preferably set to 80% or less, more preferably 60% or less.

[0045]

Effect of the invention

As mentioned above, in the present invention, water-disaggregating sheets, which generate a difference in the elongation rate when being impregnated with a liquid, are partially joined, so that swelling is generated in the sheet with a large elongation rate in a liquid impregnated state, thereby being able to form a bulky wet sheet. The bulky wet sheet can obtain a sense of holding touch close to a dustcloth. Also, the joined part is constituted by several short joined parts, so that fine folds can be made appear in the sheet with a high elongation rate. Thereby, it is easily held by the palms, and the wiping out effect of stains can be improved by the folds.

Brief description of the figures

Figure 1 is an oblique view showing the entire structure of the water-disaggregating wet sheet of the present invention.

Figures 2(A), (B), and (C) are cross sections sequentially showing part of the processes for manufacturing of the water-disaggregating wet sheet of the present invention.

Figure 3 is a plan view showing a pattern of an adhering and joining part for adhering and joining the sheets.

Figure 4 is a plan view showing another pattern of the adhering and joining part.

Figures 5(A) and (B) are cross sections showing other constitutional examples showing the laminated structure of sheets.

Figure 6 is a cross section showing a modified example in which small holes are bored in sheets.

Explanation of symbols

1	Water-disaggregating wet sheet
2	Adhesive
3	Small hole
S1	First water-disaggregating sheet with a low elongation rate
S2	Second water-disaggregating sheet with a high elongation rate
A	Adhering and joining part
B	Fold
a	Short joined part

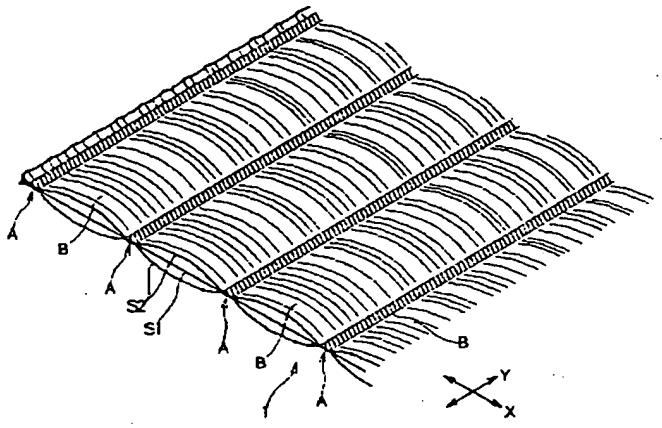

Figure 1

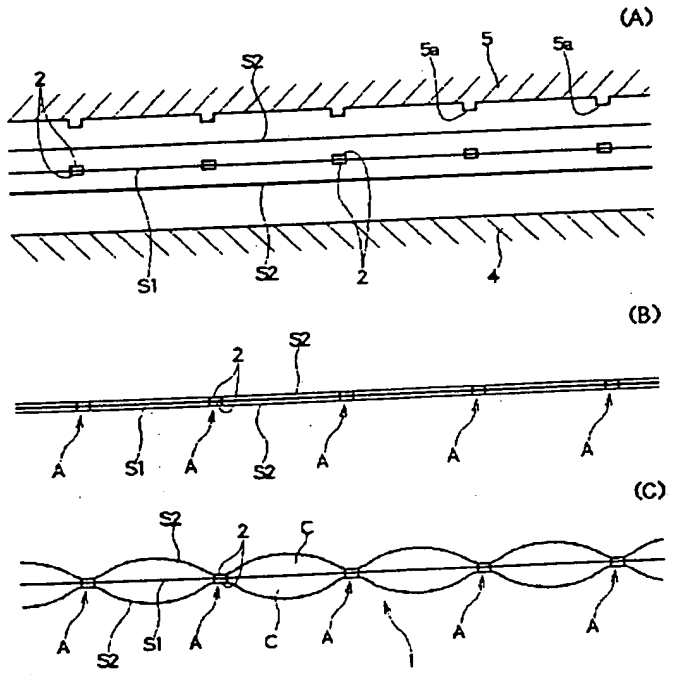

Figure 2

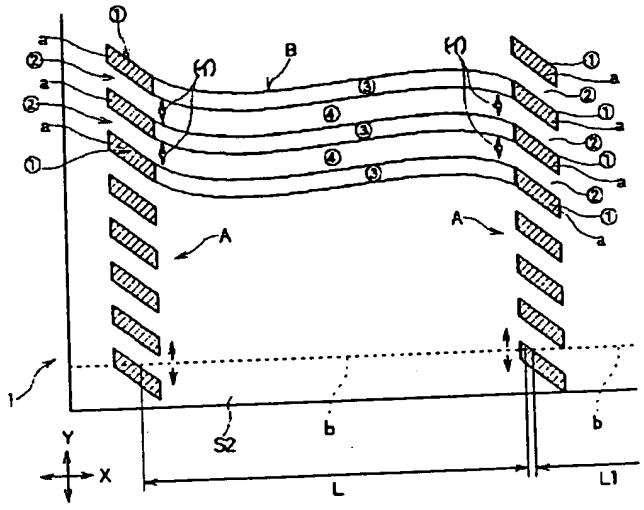

Figure 3

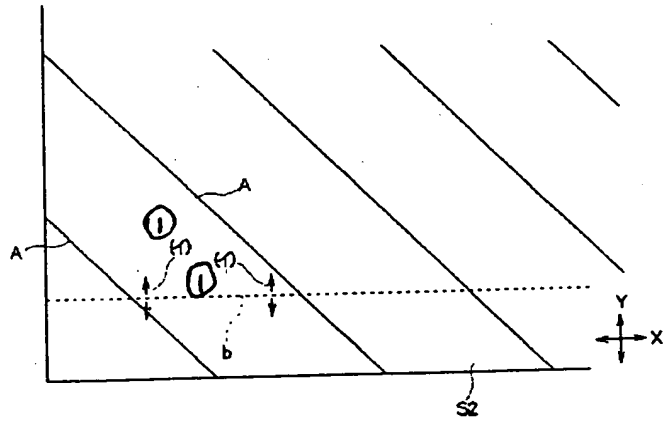

Figure 4

Key: 1 (i)

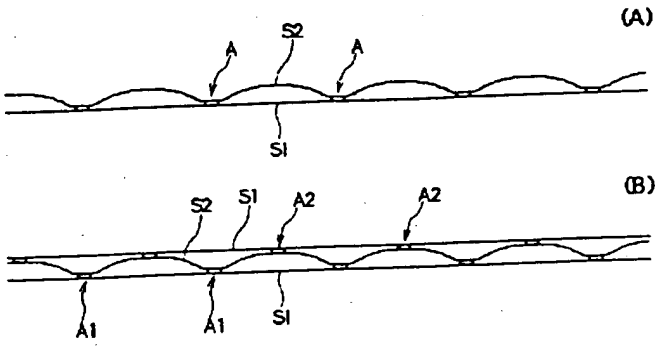

Figure 5

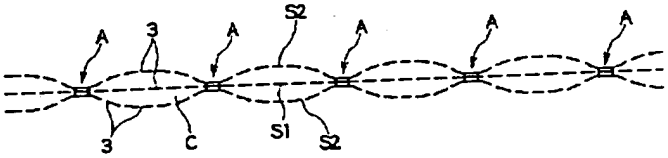

Figure 6

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